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November 22, 2010

ULNRC-05745

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

10CFR50.73(a)(2)(i)(B),
10CFR50.73(a)(2)(ii)(B),
10CFR50.73(a)(2)(v)

Ladies and Gentlemen:

DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC CO.
FACILITY OPERATING LICENSE NPF-30
LICENSEE EVENT REPORT 2010-008-00
INADEQUATE ANALYSIS RESULTS IN A COMPONENT
COOLING WATER TRAIN DECLARED INOPERABLE

The enclosed licensee event report is submitted in accordance with 10CFR50.73(a)(2)(i)(B), 10CFR50.73(a)(2)(ii)(B), 10CFR50.73(a)(2)(v)(B), and 10CFR50.73(a)(2)(v)(D) to report a condition in which non-conservative assumptions were identified in a Component Cooling Water piping calculation. Callaway Plant expects to submit a supplement to this report by February 28, 2011.

Sincerely,

Fadi M Diya
Vice President Nuclear Operations

CSP/nls

Enclosure: LER 2010-008-00

cc: Mr. Elmo E. Collins, Jr.
Regional Administrator
U.S. Nuclear Regulatory Commission
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Index and send hardcopy to QA File A160.0761

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Fort Worth, TX 76109
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LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
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4. TITLE

Inadequate Analysis Results in a Component Cooling Water Train Declared Inoperable

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
09	23	2010	2010	008	00	11	22	2010	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE

1

10. POWER LEVEL

100%

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☒ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☒ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☐ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☒ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☒ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
T.B. Elwood, Supervising Engineer, Regulatory Affairs and Licensing	314-225-1905

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

☒ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☐ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR
02	28	2011

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

The Component Cooling Water (CCW) system consists of two trains with two 100% capacity pumps per train, each supplying cooling water flow to its independent safety loads and a common service loop. On September 23, 2010 several non-conservative assumptions were identified in the calculation that analyzed a postulated pipe break in the non-seismic portion of the service loop to the Radwaste building. Review of the analysis determined that the net positive suction head for the CCW pump could be jeopardized, making the CCW train inoperable.

The train of CCW connected to the service loop was declared inoperable on September 23, 2010 at 1730. The CCW train was restored to operable status on September 23, 2010 at 1802 by isolating the service loop from the CCW train. As an interim measure, CCW to loads in the Radwaste building will remain isolated. During times when CCW is needed for the Radwaste building loads, Callaway will comply with the Action requirements of TS 3.7.7, Component Cooling Water System.

Calculation M-EG-12-C, Component Cooling Water System, will be revised. Long-term resolution of the condition is under evaluation.

1. DESCRIPTION OF STRUCTURE(S), SYSTEM(S) AND COMPONENT(S):

The Component Cooling Water (CCW) system [EIIS system: CC] consists of two trains with two 100% capacity pumps [EIIS system: CC, component: P] per train, each supplying cooling water flow to its independent safety loads and a common service loop. An independent surge tank [EIIS system: CC, component: TK] is connected to the suction of each train via a 4-inch line.

The CCW service loop provides flow to safety related and non-safety related loads and as such is constructed of ASME Section III Class III seismic Category I piping with an exception for the ANSI B31.1 non-seismic portion that supplies cooling water to the Radwaste [EIIS system: WD] building and Nuclear Sample Station coolers. This non-seismic section of piping is automatically isolated upon the receipt of a Safety Injection Signal (SIS), high flow indication in the non-safety related piping, and low CCW surge tank level.

During normal operation only one train of CCW is connected to the service loop. This train has one pump in operation supplying cooling flow to the service loop. The other three CCW pumps are normally in standby. Additionally, procedures are in place for MODE 4 operation to run two pumps in the train that is supplying both the Residual Heat Removal (RHR) heat exchanger [EIIS system: BP, component: HX] and the service loop.

2. INITIAL PLANT CONDITIONS:

The plant was in MODE 1 when the condition was discovered. No structures, systems or components were inoperable at the time of discovery that contributed to this event.

3. EVENT DESCRIPTION:

The event is a postulated pipe break in the non-safety related, non-seismic Category I section of the CCW system downstream of the automatic isolation valves EGHV0069A/B and EGHV0070A/B. The break is postulated to be initiated by an external or seismic event. A break in the supply side was analyzed by the plant's architect engineer in 1985 with a determination that the break would be isolated in sufficient time that adequate net positive suction head (NPSH) would still be available for the CCW pumps.

On September 23, 2010, several non-conservative assumptions were identified in the

calculation. From reconsideration or review of those assumptions, the preliminary determination at this point is that, in the event of the postulated break, the CCW surge tanks may not be able to maintain a flooded CCW pump suction line in the event of a guillotine break in the non-seismic Category 1 piping and water column separation could occur which could jeopardize the required CCW pump NPSH.

As a result of this issue, the CCW train connected to the service loop that supplies cooling water to the Radwaste building was considered to be inoperable. Technical Specification (TS) 3.7.7 was entered on September 23, 2010 at 1730. The TS was exited on September 23, 2010 at 1802 by isolating the Radwaste building loads from the inservice CCW train.

Periodically, the service loop is transferred to the opposite CCW train. During the short period of time for the transfer both CCW trains are lined up to the service loop, which makes both CCW trains inoperable assuming a guillotine break of the non-seismic Category 1 piping occurs during the train transfer. Additionally, there have been several instances within the past 3 years where the CCW train that was not supplying the service loop was taken out of service for maintenance, resulting in both CCW trains being inoperable.

4. ASSESSMENT OF SAFETY CONSEQUENCES:

The CCW System provides a heat sink for the removal of process and operating heat from safety related components during a Design Basis Accident (DBA) or transient. During normal operation, the CCW System also provides this function for various nonessential components, as well as the spent fuel storage pool [EIIS system: DB, component: TK]. The CCW System serves as a barrier to the release of radioactive byproducts between potentially radioactive systems and the Essential Service Water System [EIIS system: BI], and thus to the environment.

The safety significance for this issue is low. When one train of CCW is aligned to the service loop, the likelihood is low for an event that would cause a break in the service loop that would make the CCW train inoperable. In this case, a second train of CCW is available and operable. Also, during the short period of time when both trains of CCW are aligned to the service loop, the likelihood is lower for an event that would cause a break in the service loop.

5. REPORTING REQUIREMENTS:

Technical Specification (TS) 3.7.7 requires two trains of CCW to be operable in MODES

1 through 4. Since plant startup, one train of CCW has been aligned to the service loop to the Radwaste building making that train inoperable (for the reason explained previously). The amount of time that the service loop is aligned to the CCW train exceeds the allowed outage time in TS 3.7.7. Therefore this issue is reportable per 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by Technical Specifications.

When the service loop is transferred to the opposite CCW train, both CCW trains are aligned to the service loop for a short period of time, thus making both trains of CCW inoperable. This occurred approximately 230 times at an estimated duration of 2 to 3 minutes per occurrence. Additionally, during times when the CCW train that is not connected to the service loop is taken out-of-service or made inoperable for maintenance, both CCW trains are inoperable. There were approximately 23 instances of this. These conditions are reportable per 10 CFR 50.73(a)(2)(v)(B) and (D) as a safety system functional failure.

Preliminary analyses by Engineering, Safety Analyses, and a vendor indicate that a postulated double-ended guillotine break of the non-seismically supported CCW supply line to Radwaste could result in void fractions potentially exceeding what is allowed to prevent pump damage.

Operating the CCW pump with the large void fraction shown in the preliminary analyses could damage the operating pump. Thus, following a seismic event which results in a guillotine break of the non-seismic Category 1 piping, the CCW loop supplying the service loop may not be able to meet two of its FSAR described safety design bases to remain functional after a safe shutdown earthquake (SSE) and to perform its intended function following the postulated hazards of fire, internal missile, or pipe break, and to remove heat from components important to mitigating the consequences of a loss of coolant accident (LOCA) or main steam line break (MSLB) and to transfer heat to the Essential Service Water System. As the CCW loop may not be capable of performing its specified safety functions, this condition is considered an unanalyzed condition that significantly degraded plant safety and is also reportable per 10 CFR 50.73(a)(2)(ii)(B).

An evaluation will be performed to determine if postulating a guillotine break in the moderate energy non-seismic portion of the service loop is a valid requirement for the Callaway Plant.

6. CAUSE OF THE EVENT:

This is a legacy issue that has existed since initial plant startup.

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

Inadequate analysis of the effects of a guillotine pipe break in the non-safety related portion of the CCW system due to a seismic event. The difference in hydraulic diameter between the 4 inch diameter make up line from the surge tank to the CCW pumps and the 12 inch diameter line (from the CCW pumps to Radwaste building system loads) was not taken into account.

The calculation, M-EG-12-C, Component Cooling Water System, was performed in 1985 and the preparer is no longer available for comments. Why the difference in hydraulic diameter was not taken into account in this calculation cannot be determined due to the legacy nature of this issue.

7. CORRECTIVE ACTIONS:

As an interim measure, CCW flow to loads in the Radwaste building has been isolated. During times when CCW flow is needed for the Radwaste building loads, Callaway will comply with the Action requirements of TS 3.7.7, Component Cooling Water System.

Calculation M-EG-12-C, Component Cooling Water System, will be revised.

Long-term resolution of the condition is under evaluation.

8. PREVIOUS SIMILAR EVENTS:

None identified at this time, however, this is still under evaluation.